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Mesozoic subduction history of the Paleo-Pacific plate beneath the Eurasian continent: evidence from igneous rocks and accretionary complex

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Spatial-temporal variations of Mesozoic igneous rock associations and evolutionary history of accretionary complexes in NE Asia provide direct constraints on the subduction history of the Paleo-Pacific plate beneath the Eurasian continent. The dating data indicate that the Mesozoic magmatism in NE Asia can be at least divided into six stages, Late Triassic, Early Jurassic, Late Jurassic, early Early Cretaceous, late Early Cretaceous, and Late Cretaceous (Xu et al., 2013). Late Triassic (201 - 227 Ma) magmatism consists mainly of a bimodal igneous rocks, implying an extensional environment related to the final closure of the Paleo-Asiatic Ocean, which is also supported by passive continental margin sedimentary formation in NE Asia. Early Jurassic (175 – 194 Ma) magmatism is mainly distributed in the eastern Heilongjiang-Jilin provinces, Hida in Japan, and northeastern North Korea and consists of a calc-alkaline series within the continental margin and a bimodal igneous rocks within intracontinent, implying the beginning of the westward subduction of the Paleo-Pacific plate beneath the Eurasia, which is also supported by the accretion of a Jurassic complex in SW Japan (Isozaki et al., 1997). The absence of Late Jurassic-early Early Cretaceous (135-160 Ma) magmatism in the NE Asian continental margin (including NE China, Russia Far East, Japan, and South Korea) suggests that a transform boundary could occur between the Eurasia and the Paleo-Pacific plate. In contrast, Late Jurassic-early Early Cretaceous (135 -160 Ma) magmatism only occur to the west of the Songliao Basin, suggesting that their formation could be related to the evolution of the Mongol-Okhotsk tectonic regime rather than the Paleo-Pacific tectonic regime. The late Early Cretaceous (130 - 106 Ma) and Late Cretaceous (96 – 71 Ma) magmatisms consist of a low- to middile-K calc-alkaline volcanic rocks within the Eurasian continental margin and a bimodal volcanic rocks and alkali basalts within intracontinent, respectively, implying that they formed under the subduction setting of the Paleo-Pacific plate beneath the Eurasian continent. The former is consistent with the early Early Cretaceous (145 -130 Ma) perching of the Nadanhada terrane in NE China (Wang et al., 2015). Additionally, late Early Cretaceous to Late Cretaceous as well as Paleogene magamatisms in NE Asian continental margin gradually move eastward in space (Grebennikov et al., 2016), revealing the rollback of the Paleo-Pacific subducted slab.

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